



# STATE & PRIVATE FORESTRY FOREST HEALTH PROTECTION SOUTH SIERRA SHARED SERVICE AREA



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## Summary of True Fir stands impacted by native damage agents Yosemite National Park 2023

### Introduction

Yosemite National Park proposes several treatments options which address: amending current forest conditions particularly in high elevation red fir forests, reducing hazards for public safety, and preventing future infections from native pathogens in true firs. Target locations along Tioga Road corridor will be identified, and treatments are proposed accordingly (FHP-FY24, August 8, 2023).

### Background and Observations

In the past two years, many areas in the West have been experiencing high levels of true fir mortality, most striking in sub-montane forests in Sierra Nevadas. White and red fir mortality noted in Yosemite National Park according to Forest Health mortality surveys in 2021 and 2022 ([Region 5 - Forest & Grassland Health \(usda.gov\)](https://www.usda.gov/region-5-forest-grassland-health)) has been moderate to severe (< 50% of area affected with mortality). Recent ground surveys by Forest Health Protection, and park personnel have noted multiple branch flagging, poor crown structures, dwarf mistletoe infection, dead terminals or partial die-back of crowns of trees that have eventually expired. Areas detected with high red fir mortality were on thin granitic soils or boulder fields where water availability is dependent on annual snow pack, or in overly dense stands.

As compared to pines, direct mortality associated with a primary agent is less straightforward on true firs. A complex of damage agents benefit when host trees become stressed or weakened due to drought effects or prior injury. Fir engraver (*Scolytus ventralis*) is often accountable for true fir mortality but root diseases such as *Heterobasidion occidentale* and *Armillaria* spp. are closely associated with fir engraver attacks. Other insects and pathogens also contribute to eventual deterioration of host trees, increasing likelihood of death. As droughts persist, tree stresses intensify which incites fir engraver and other agents to fully infest and further decline trees.

### Dicussion

Treatments in true firs are typically targeted in reducing pathogen incidence, and improving residual tree persistence by opening stands to redistribute limited resources, allow pine development, and reduce fuel loading. As statewide droughts have become longer in season and continually breaking record temperatures, trees experiencing chronic stress from diseases or insects are much more vulnerable. Forest Health Protection supports proactive treatments to help tree resilience as well as address additional objectives for the long-term forest health in Yosemite National Park.

Please contact me if you have any questions or concerns.

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### References

Stephenson, N., A.J. Das, N.J. Ampersee, B.M. Bulaon, and J.L. Yee 2019. *Which trees die during drought? The key role of insect host tree selection.* Journal of Ecology 107: 2383–2401.